STATUS OF PHRAGMITES COMMUNIS TRIN., VAR. BERLANDIÈRI (FOURN.) FERNALD ALONG THE SUDBURY RIVER IN EASTERN MASSACHUSETTS

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This paper is contributed as an additional note on recent changes in the aquatic vegetation of the Sudbury River, primarily in the towns of Wayland, Sudbury and Concord, Massachusetts. Several years ago I published an article on this subject (Eaton, 1947) with particular reference to the weedy behavior of *Lemna minor* L., and *Trapa natans* L., and to the fading out of *Nymphaea odorata* Ait. The two former species prefer subneutral to slightly alkaline waters, whereas the latter thrives chiefly in neutral to slightly acid water overlying rich organic mud. These changes were correlated with marked concurrent increases in river pollution by alkaline sewage waters, a suggestion which has been generally accepted as a likely explanation of the observed phenomena.

Recent observations of the behavior of *Phragmites communis* Trin. var. *Berlandièri* (Fourn.) Fern. in the grassy meadows bordering the Sudbury River near Wayland add one more bit of information to the subject.

The North American variety of *P. communis* is considered an uncommon species in New England where it occurs chiefly near the coast on borders of brackish marshes, or on pond margins, etc., associated with underlying glacial clays. It appears to be very scarce inland in eastern Massachusetts, being cited as occurring inland only at Andover and S. Lincoln without reference to specimens (Boston District, 1913). Presumably the S. Lincoln station is on the Sudbury River meadows which border that town on the west. Until this year I have considered it a rare plant in the Sudbury River Valley. The Herbarium of the New England Botanical Club contains only one specimen from this area, collected in Wayland, July 31, 1859, by H. D. Thoreau. Although I have been familiar with these river meadows at all seasons of the year for about fifty years I never encountered *Phragmites* in the region until the winter of 1949–50, when I found a few scattered fruiting culms sticking up through the meadow ice on

the west side of the river channel not far below the lower Wayland-Sudbury bridge. At that time I made an extensive survey on skates of a very large acreage of the meadows in order to ascertain the local distribution of the plant. Conditions were favorable for such a search, as the grass had not been cut for several years and the flooded meadows had frozen over for the first time a fortnight or so previously. No appreciable movement of the ice had occurred to shear off the embedded grasses. I found two small areas where scattered fruiting culms were exposed above the ice, both of them in the upper (Wayland) end of the meadows on the west side of the river channel.

This year on January 22, 1952, I made another survey on skates of the meadows on the west side of the river from the Concord line up to the Wayland bridge, a distance of about seven miles. No *Phragmites* was found below the areas noted in 1949–50, but fruiting culms were far more abundant in more extensive and numerous (four) patches. I returned two weeks later for specimens. The two additional colonies found this year were by far the most conspicuous. One of them, near the Wayland golf course on the east side of the channel, consisted of a narrow dense strip about thirty meters long; the other, across the meadows a third of a mile to the northwest, was a luxuriant growth about seventy-five meters long by twenty-five meters wide, and clearly visible through binoculars at a distance of a half mile. I am confident that these two patches did not fruit in 1949; otherwise I would not have overlooked them the following winter.

As judged by the winter occurrence of fruiting culms in this locality I think that *Phragmites* has prospered exceedingly well during the past few years and in all probability has increased strikingly in abundance and in vigor as well. During the past fifty years or more the Sudbury River meadows have been frequently explored by competent botanists. It is difficult to believe that it would have been overlooked by such men as M. L. Fernald, Emile Williams, A. W. Hosmer (of Concord) and many others, if formerly it had been as conspicuous and plentiful as now. (One large patch grows in the open meadow within fifty meters of the Wayland-Sudbury road.) Therefore, I hazard the guess that it has persisted sparsely in the area for a very long

time in a depauperate and vegetative state, rarely fruiting until very recently.

Assuming that the status of this grass has in fact changed, it is reasonable to infer that it has done so in response to changed nutritional factors arising from increased sewage pollution. Fassett states that *Phragmites communis* in North America occurs mostly in brackish places (Fassett, 1940); Svenson characterizes it as an "indifferent halophyte" (Svenson, 1927); Fernald refers to it as commonly maritime (Fernald, 1910). Obviously, the acid soils and peats of central Middlesex County are not favorable to its proper development, whereas the annual flood waters of a heavily polluted stream, frequently stagnating on the meadows until well into May, are likely to furnish the alkalinity required for normal luxuriance.

In this connection, I am reminded of finding true *Potamogeton pusillus* L. (= *P. panormitanus* Biv.) in the Sudbury River near Wayland in the summer of 1933. Quoting from a note in Rhodora on the subject: "According to Fernald it shows a very striking preference for basic or slightly alkaline (or brackish) waters. Consequently it seems somewhat out of place in a sluggish river noted for its peaty meadows." (Eaton and Griscom, 1934.) In the light of my later *Lemna* article, the occurrence of this pond weed in the polluted river, infrequently if ever to be found in neutral to acid waters, seems less strange than when first collected. Even in 1933 the river was strongly polluted by sewage, as shown by chemical analysis (See Table of Water Analyses in Eaton, 1947). The increasing abundance of *Wolffia columbiana* Karst, another plant chiefly of alkaline waters, twelve miles farther downstream in Concord is also suggestive of vegetational changes in the river. It was first collected there in 1938, an eastward range extension from the general line, Lake Champlain-Connecticut River-western Connecticut (Eaton, 1939).

Lincoln, Mass.

Literature Cited

Boston District. 1913. Report on theFlora of the Boston District, XVII. Rhodora **15**: 131. 1913.

Eaton, R. J. 1939. Wolffia columbiana Karst in Concord, Massachusetts. Rhodora **41**: 42, 1939.

————. 1947. Lemna minor as an Aggressive Weed in the Sudbury River. Rhodora, **49**: 165–171. 1947.

Eaton, R. J. and L. Griscom. 1934. Potamogeton panormitanus in the Sudbury River. Rhodora **36**: 312, 1934.
Fassett, N. C. 1940. Manual of Aquatic Plants. New York.
Fernald, M. L. and K. M. Weigand. 1910. A Summer's Botanizing in Eastern Maine and Western New Brunswick. Rhodora **12**: 118. 1910.
Svenson, H. K. 1927. Effects of Post-Pleistocene Marine Submergence in Eastern North America. Rhodora **29**: 64, 68. 1927.

The Type of Ulmus americana L.—The type of *Ulmus americana* L. has been a problem ever since the days of Asa Gray. So long as only one form of the white or American elm was recognized, the problem could be allowed to rest without disturbing taxonomists.

Now however since at least four different forms are recognized, a solution is more urgent. It becomes more important to ascertain which is the type and what are the distinctive characters of the type.

Dr. M. L. Fernald in proposing four forms stated: "so far as I can find, the actual type of Linnaeus has not been closely examined to determine to which of the four variations it belongs."[1] The photograph of the type which he had before him, he added, was "wholly inconclusive." (l.c.)

As war-time conditions doubtless made it impracticable to follow the matter further just then in order to solve the problem, the uncertainty continued through the publication of the eighth edition of Gray's Manual, which again described four forms without indicating which was typical.

Recently some correspondence with English botanists has thrown light on the question. I wish here to acknowledge with great appreciation the help of Mr. S. Savage, Assistant Secretary of the Linnaean Society of London, and especially of Dr. R. Melville, of the Royal Botanic Gardens, Kew. The latter has sent me conclusive information.

The first question is to determine with certainty what specimen is the type. In order to set forth the facts fully and avoid subsequent doubt on some points, three sheets in the Linnaean Herbarium may well be cited:

1. Sheet No. 321.1 needs to be mentioned only to eliminate it from consideration, as it is *Ulmus campestris* L. or, as that is regarded as a nomen ambiguum, it is better known as *Ulmus glabra* Huds. It has no bearing on the type of *Ulmus americana* L.

[1] Rhodora **47**: 132 (1945).